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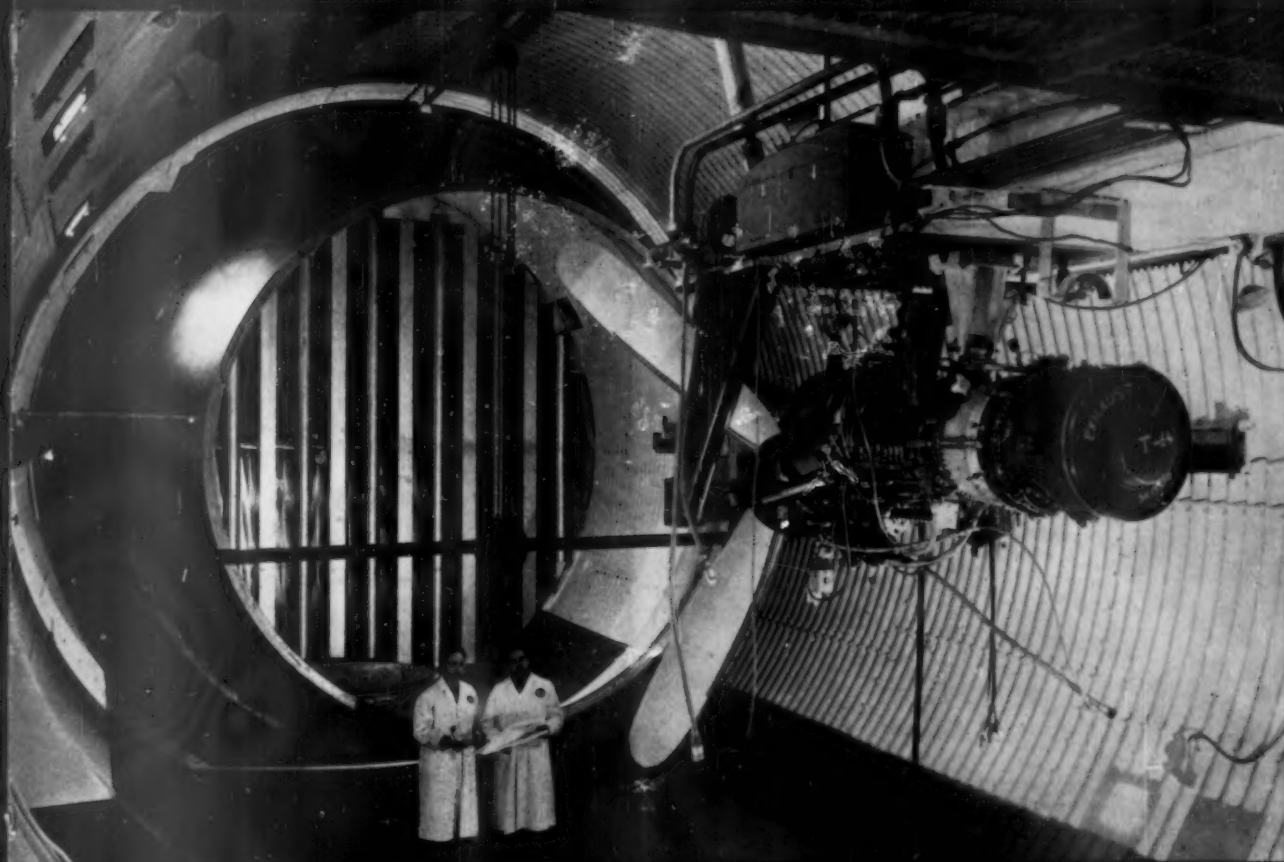
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VOL. 75 NO. 26

PHOTOGRAPHY

# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



A SCIENCE SERVICE PUBLICATION

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## TESTIMONIALS: From An Observer

On clear "good-seeing" nights my Dynascope easily reveals the Alpine Valley and the Straight Wall on the Moon, as well as three peaks in the floor of the Plato ring plain. It will split the star Mizar into its major components clearly. It will separate Saturn's rings and show six bands on the face of Jupiter. Also it will project a two-foot diameter disk of the sun showing sunspots in vivid detail . . . as an Englishman might express it, "Dynascope optics are a little bit of all right."  
 —VICTOR W. KILLICK, in charge of Astronomical Observatory, Sacramento Junior College, Calif.

## Many Years of Experience

. . . I have had many years of experience in astronomy, and as junior leader here in Atlanta I always recommend Dynascope.  
 —LEONARD E. ABBEY, Jr., Decatur, Ga.

## Cannot Be Equaled

I still don't see how you can produce a parabolic mirror of this focal ratio at the price . . . Epsilon Lyra was quite easy . . . on the 130 power ocular. I was more than pleased when it resolved this double double as four tiny, sharp, brilliant gems . . . with the diffraction rings concentric and sharp.  
 . . . For the price you ask, I do not believe that it can be equaled in any way. The oculars are excellent, and the entire instrument shows careful workmanship. How you do it is beyond me. —G. N. JOHNSTONE, Albuquerque, N.M.

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## GENETICS

# Map Human Chromosome

Scientists are using electronic computers to map the location of specific genetic determiners, such as for some diseases, on the human chromosomes.

THE LAST "terra incognita" of the human body is being mapped and computers are helping to do the job.

Researchers at Johns Hopkins University have developed a way to use computers to map the human chromosome, Prof. S. A. Talbot told scientists at a medical symposium in Poughkeepsie, N. Y.

"What we are out to determine by linkage studies is the location of genes for such things as eye color, blood groups and specific hereditary diseases," he said. By using marker traits—the various blood groups and inherited traits like the ability to taste certain chemicals—it is possible to map the chromosome.

Actually, this is done by determining what genes travel together. The computers, or electronic "brains," are used to figure the probabilities of two hereditary traits, for example, being located on the same chromosome. By "telling" the computer which persons have a certain specific genetic disease, it is possible to compute the genetic make-up of parents and other relatives, using the disease as a marker.

Using the example of elliptocytosis, a rare dominant trait in which the red blood cell has an elliptical shape, Prof. Talbot showed how the computer can locate genes on a chromosome. With the machine and the dozen or so marker traits known to exist in man, scientists should be able to assign a linkage group on a particular chromosome to one in five of the hereditary traits studied.

As yet, he said, only three linkages have been proven in man. But this is a start on the mapping problem of where genes are located.

In reporting the study, prepared by Dr. Victor McKusick and himself, Prof. Talbot said the computer program could be set up so that a five-generation family can be studied. A major problem that remains is that of collecting family pedigrees, however. Scientists can experiment with fruit flies and mice, Prof. Talbot pointed out, but they have to learn about man's genes by taking family histories.

It may now be possible, the researchers said, to establish an international linkage analysis center where properly collected pedigree data can be studied.

In addition to the scientific challenge of mapping the human germ plasm—a challenge as great as the urge to climb Mt. Everest or go under the polar ice cap in a submarine—there are practical applications to the study. It would be possible to predict the probabilities of a man and wife having children with certain genetic diseases, for example.

Commenting on the significance of being able to map human chromosomes, Dr. H.

Warner Kloefer, professor of medical genetics at the Tulane University Medical School, told SCIENCE SERVICE he was hopeful it could mean the beginning of preventive genetic medicine.

Knowledge of the location of the genes that are involved in inherited disease, together with our growing knowledge of the chemistry of the DNA that makes up the chromosome, go together to give an optimistic picture. It may one day be possible to give "good DNA" to a pregnant woman known to be a carrier of a gene for a specific disease, for example. With our current interest in man's chromosomes, mutations and genes, Dr. Kloefer predicted that advances would be made in medical genetics at a much faster rate than has been made in the medicine of communicable diseases.

It has taken about one hundred years to reach our present position in preventive medicine where so many diseases are virtually controlled. It will take much less time before we reach a comparable spot in genetic disease, he said.

The current concern with the possible genetic effects of fallout has added to the

public interest in the human chromosome, Dr. Kloefer pointed out. This together with our growing store of knowledge of DNA and our ability to control communicable diseases are hopeful signs, he said.

## Machines Aid Biologists

COMPUTERS can be a big help to the medical world.

Scientists attending the same symposium, sponsored by the International Business Machines Corporation, discussed the many ways computers are helping the medical researcher—whether he is interested in diagnosing disease, reading an electroencephalogram or figuring out what bacterial might be susceptible to what drugs.

Many complex questions can be solved faster and more accurately with computers than the researcher ever believed possible. Patients' records can be more useful to the doctor. Model situations can be set up, imitating what might happen in the living organism or living cell, so that the researcher can make predictions and test theories.

Dr. G. W. Petrie III of IBM told how special IBM devices have made it possible to give the current status in cancer chemotherapy of an organic chemical. This means, he explained, that it is now possible to make periodic progress reports together with completion reports as tests of individual compounds are finished. The researcher can also look up file entries of compounds with specific characteristics. Then he can select one for continued research.

Currently some 1,200 reports per day are being entered into the RAMAC 305 memory and added to previous test records.

Computers are also helping scientists in their study of a typical nerve system, the pupil of the human eye. A digital computer is being used as a model of the pupil system, Dr. Lawrence Stark of Yale University reported. He estimated that a high-speed computer will enable researchers to compare the model with the "real pupil in real time." This research is still in the developmental stage.

Illustrating the important role of computers in medical research, Dr. James W. Sweeney of Tulane University described one computer center, the first such center in the South to be devoted entirely to university teaching and research.

As director of Tulane Computer Center in New Orleans, Dr. Sweeney outlined his experiences in initiating medical researchers into the mysteries of computer research. Time and "scientific conservatism" complicated the introductory process, he said.

The Tulane medical school staff, as at other universities, found it difficult to take the necessary time to learn about computers. Also some scientists were "against the introduction of computers in the medical research process," Dr. Sweeney pointed out.

However, the Tulane center, in operation for about a year now, is beginning to play an important part typical of other computer centers throughout the nation in experimental medical research and in collecting and recording clinical information.

Science News Letter, June 27, 1959



**INSECTS FOR AGRICULTURE—**  
A constant supply of uniform insects is needed in entomology research. At Eli Lilly's new research center for agricultural sciences, near Greenfield, Ind., a researcher raises bean beetle nymphs on bean plants. The insects are used in testing insecticides.

# SCIENTIA INTERNATIONAL

## NOVAS DEL MENSE IN INTERLINGUA

**Materiales.**—In circulos technic del Status Unite on crede que le utilitate extraordinari del plastic polyethyleno va tosto esser equalate o excedite per illo del nove plastic polypropyleno que esseva lanceate al mercato in Italia minus que duo annos retro.

**Astronautica.**—Senior J. G. Vaeth, representante un suborganisation pro recercas astronomic intra le Departamento de Defensa del Status Unite, ha exprime su opinion que le problemas technic in le projecto de lancer un homine in un viage satellitari circa le terra es plus o minus solvite. Sed, dice senior Vaeth, ante que on execa un tal projecto, on debe esser secur que un homine como viaggiator cosmic essera plus efficace que omne existente apparatus non-animante in le effectuation del observationes que nos expecta ab nostre prime expeditiones astronomic. Senior Vaeth crede que ab iste puncto de vista (e a iste tempore in le historia del progresso technologic) machinas es superior a humanos.

**Astronomia.**—Secundo un reporto del Observatorio Harvard a Cambridge, Massachusetts, observationes astrophotographic facite in Nove Mexico con cameras del tipo Baker super-Schmidt permette le calculation que omne die novanta miliones meteoros de magnitudes opticamente detegibile penetra nostre atmosfera usque a un distancia de novanta kilometros ab le superficie del terra.

**Obstetricia.**—Un physica medical britannic ha perfectionate un stethoscopio electronic que rende audibile le sonos cardiac de fetos durante le processo del nascentia. Le manipulation del apparatus es satis simple pro recomendar lo al uso routinari mesmo per simple obstetricas sin training academic. Le apparatus consiste in principio de duo minuscul microphonos que es attachate al corpore del matre e de un dispositivo special que es appellate soniscopio e que effectua un amplification selective del sonos cardiac del feto. Quando irregularitates de sono indica irregularitates functional in le corde del feto, le apparatus reage per un signal de alarma indicante que mesuras de urgentia (medical o mesmo chirurgic) es requirite. On spera que le uso generalisate del apparatus va reducer substantialmente le mortalitate fetal e etiam matre durante le processo nascentia.

**Psychologia Animal.**—In le laboratorios psychobiologic del Universitate Cornell, capras neonate esseva subiecte a experimentos de reflexo conditionate ante que illos habeva establite un relation normal con lor matres. Quasi omne le capras assi tractate moriva ante le tempore de lor maturitate. Le examine necropic de illos revelava plus o minus marcate grados de malfunction in lor glandulas suprenal, specialmente con respecto a lor production de cortisona. Le experimentos supporta le conclusion que neonatos subiecte a stresses innatural es impericulate in lor disveloppamento subsequente. Il pare plausibile cercar in stresses perinatal le causa de varie morbos chronic e de un comportamento neurotic o psychotic del parte de individuos adulte, tanto animal como etiam human.

**Energia Atomic.**—Strontium-90 e altere periculose isotopos que es producite in le generatione de energia per fission atomic pote esser includite in blocos de vitro e assi rendite innocue pro generationes futur. Tal blocos pote esser immergite in le oceano sin ulla periculo, proque aqua (incluse aqua marin) exerce quasi nulle effecto super le vitro. Le technica del inclusion de isotopos in vitro esseva disveloppate in Canada.

**Ichthyologia.**—In recercas al Station Experimental de Pischeria Pacific a Vancouver in Columbia Britannic, il esseva constatate que le pelle human exerce substantias que repelle salmones (e possibilmente altere pisces) in dilutiones de un parte in plure miliones partes de aqua. Un tal substantia esseva identificate como serina, sed serina pur se provava minus displacante al salmones que aqua in que un humano habeva lavate su manos.

**Alimentos.**—Le U.R.S.S. produceva in 1958 un total de 2,6 miliones tonnas metric de grassia e oleo. Oleos vegetal representava plus que 46 pro cento de iste total. In 1959 on expecta un record ancora plus alte, principalmente in consequentia de un excellentissime recolta de tornasol (i.e. helianthos). Inter 1941 e 1956 le production russe de oleos vegetal ha cresce per quasi 100 pro cento. Es interessante que iste resultado esseva effectuate primariamente per un melioration del methodos e machinas de extraction. Le numero del fabricas in iste branca ha remanite plus o minus stabile. Le production de grassia e oleo in Russia es hodie inferior solmente a illo in le Status Unite e in China. Del altere latere, le consumption de grassia e oleo per capite in Russia es minus impressionante. Illo es 30 libras per anno. In le Status Unite illo es 61 libras e in Europa occidental 50.

**Recercas de Tuberculose.**—Le chimioterapia de tuberculose suffre del facto que le bacterios tuberculosi deveni resistente in le curso del tempore tanto contra le combination de isoniazido con acido para-aminosalicylic como etiam contra le combination de isoniazido con streptomycin. (Iste duo combinationes es currentemente le plus popular proque illos es considerate como le plus efficace.) Viste que le resistencia in question ha nunquam essite observate intra minus que tres septimanas post le initiation del therapia quando un sol droga es usate e que illo es retardate per le uso de duo drogas in combination, Dr. E. T. Peer de Ontario in Canada ha experimentate, usque nunc con excellent successo, con alternante periodos de quatro septimanas de therapia per le un e le altere del duo mentionate combinationes.

**Technologia.**—Methano, le componente principal de gas natural, se liquifica a minus 161 C. In le processo illo reduce su volumine a un sex centesimo. Tamen, le pression necessari pro tener iste gas in stato liquide a plus elevate temperaturas rende impractic su transporto in grande quantitates. Iste problema ha essite resolute per un firma american qui ha recentemente delivrate un cargo de methano a Anglaterra. Le gas in forma liquide esseva includite in tanks de aluminio, e istos se trovava sub pression atmosferic in un nave specialmente equipate pro le mantenentia de un temperatura de minus 161 C. Iste evento esseva le culmination de cinque annos de recercas technic.

**Physiologia.**—Le Indianos Navajo ha plus basse nivellos de cholesterol in lor sero que le statounites non-indian. Etiam lor incidentia de morbo cardiac es plus basse, sed isto in despecto del facto que lor consumption de grassia non differe ab illo de lor compatriotas de racia blanc. Dr. D. C. Miller del Servicio de Sanitate Public Inter le Indianos ha establite iste facto e conclude ab illo que le causas de alte nivellos de cholesterol in le sero es in parte hereditari e non exclusivemente dietari.

**Navigation.**—In Sveda un passage libere de glacia esseva tenite aperte le hiberno passate in le Laco Malaren per le perfusion del aqua con bullas de aere comprimite que emanava ab perforate tubos de plastic disponite al fundo del laco.

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Science News Letter, June 27, 1959

### GENERAL SCIENCE

## Reading Interlingua

YOU CAN READ Interlingua if you had no more than one semester of high school French or Spanish or Latin and flunked it. You can read and understand a great deal of it even if you had never had contact with any foreign language.

Send this page to an acquaintance abroad and tell him that he can get additional information about Interlingua from Dr. ALEXANDER GODE, SCIENCE SERVICE's Interlingua Division, 80 E. 11th St., New York 3, N. Y.

Financial contributions to the Interlingua program are needed.

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## PUBLIC HEALTH

# Polio Virus Put in Candy

**Russia is currently perfecting a candy that contains the live polio virus. Trial tests to date indicate favorable results with the candy vaccine.**

RUSSIAN SCIENTISTS and confectioners are making batches of candy that contain live viruses.

This medical bonbon not only tastes like candy, but, more important, the viruses so far have produced safe levels of polio antibodies, Dr. Albert Sabin, a researcher in the field of live virus vaccine at the University of Cincinnati, told SCIENCE SERVICE.

The Russian confectionery industry is currently working on this project, Dr. Sabin learned from a recent trip to that country. The candy vaccine is not available for general distribution yet.

Dr. Sabin was one of 50 specialists attending a World Health Conference on the live polio virus vaccine in Washington. He referred to 1959 as the "ILPVVY," International Live Polio Virus Vaccine Year, comparable in scope to the recent IGY.

Scientists from throughout the world pooled information and results of studies to date concerning the practicability and safety of using live virus vaccine.

Conditions all over the world are different in regard to polio, Dr. Sabin, developer of one of the three strains of live virus vaccines being tested, pointed out. For instance, the tropical and subtropical climates of South America affect outbreaks and control of polio in a different manner than would be found in the Soviet Union.

Dr. Sabin sent live virus vaccine to Russia where 3,800,000 Soviets received an experimental dose. An additional 143,000 Czechoslovakians, 200,000 citizens of Singapore and 2,250,000 Mexicans also received the vaccine. Results seem to be good, Dr. Sabin said.

Another mass inoculation program was conducted in the Belgian Congo where an epidemic of polio had broken out. Dr. Hilary Koprowski of the Wistar Institute of Philadelphia, developer of another strain, reported favorable results from that program. Institute scientists are just completing inoculation of 75,000, bringing the total of those vaccinated in the Belgian Congo to 320,000.

Most of these Africans received type one vaccine only since that type is most prevalent in the Congo.

The reasons many scientists favor live vaccine are as follows:

The attenuated, or live, virus vaccine is preferable to the Salk killed virus because it produces longer lasting immunity. Furthermore, the killed vaccine protects only against paralyzation. The live virus, on the other hand, protects from both paralyzation and infection. Thus a person who has received the live virus cannot be a "carrier" or spreader of the disease. Persons immunized by a live virus vaccine also pass the

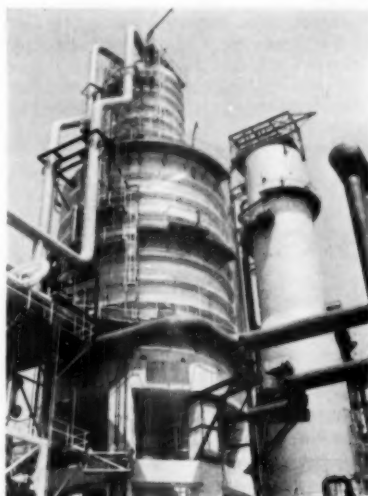
immunity to others within the family. This results in a protective antibody level for some members of the family who would not receive shots.

Despite all of this favorable evidence, however, the U. S. Public Health Service has taken a position of conservatism on the live virus vaccine question.

Surgeon General Leroy E. Burney has pointed out the advantages of this vaccine, including lower cost, longer immunity and ease of administration. (The vaccine can be given in syrup, spray or pill form.)

Many questions remain unanswered, however. First, does the live virus invade and damage the nervous system? Second, how successful or harmless is the spread of the virus from one member of a family to another? Can all three types of polio virus be combined into one effective dose? How valid are the data from those countries that have used the live vaccine?

Dr. Herald Cox of the Lederle Laboratories, Pearl River, N. Y., the researcher of the third strain of live vaccines, was also on hand to add to the information that will help the USPHS set up criteria for the eventual use of the vaccine.



**OIL PIPE STILL**—What is believed to be the world's largest crude oil pipe still, with a design capacity of 140,000 barrels a stream day, has started operating. It will replace nine smaller stills, Standard Oil Company (Indiana) at Whiting, Ind., reported. Three furnaces supply the heat needed to distill the crude oil processed daily.

The vaccine has not been tried on a mass scale in the United States because a great percentage of this population has become immune through the use of the Salk killed vaccine.

These three American researchers plus 47 other specialists around the world will attempt to establish a program to eliminate polio throughout the world.

Science News Letter, June 27, 1959

## AERONAUTICS

## Jet Flights Smoother Above 40,000 Feet

JET AIRPLANE flights are smoother above 40,000 feet than between 20,000 and 40,000, two scientists have found.

This may mean more comfortable rides for thousands of air travelers flying in the new jet planes, which can cruise at altitudes up to about 42,000 feet.

The scientists measured "clear-air turbulence" at heights between 20,000 and 55,000 feet over western United States, England and western Europe, Turkey and Japan. Clear air turbulence is the name given to patches of gusty, rough air, which can bounce a plane some 500 feet or more. It does not betray its presence by cloud formations.

Turbulent air encountered during most airplane flights usually is found near or in clouds.

Clear air turbulence, the scientists found, is met only about two percent of the time at altitudes between 40,000 and 55,000 feet. Between 20,000 and 40,000 feet, however, it would be encountered about five percent of the time.

Drs. Thomas L. Coleman and May T. Meadows of the Langley Research Center, National Aeronautics and Space Administration, Langley Field, Va., reported results of the airplane measurements of atmospheric turbulence to NASA headquarters in Washington, D. C.

Science News Letter, June 27, 1959

## ENGINEERING

## Test Gas Turbine Engine As Powerplant in Aircraft

See Front Cover

A NEW turboprop-turboshaft engine, the 2,650 horsepower T64, has been designed by the General Electric Company.

In one version of the aircraft engine, it will operate continuously at angles from 100 degrees above to 45 degrees below horizontal. As a turboshaft engine it will operate at a 45 degree "nose down" position for helicopters performing air to ground and air to water towing missions.

In the photograph on the cover of this week's SCIENCE NEWS LETTER the turboprop version is shown in one of the test cells designed for the engine at Lynn, Mass. The engine was designed as a powerplant for support aircraft such as carrier or water based anti-submarine warfare airplanes, VTOL-STOL transports and missile carriers.

Science News Letter, June 27, 1959

## CHEMISTRY

# New Plastics Foreseen

PLASTICS that may surpass polyethylene, now the leading material of the growing family of polymers or long-chain molecule substances, promise to result from basic research done principally in Germany and Italy. In addition, straight chain alcohols and cyclic compounds with up to 16 carbon atoms can be produced.

Substances that promote chemical reactions between oil chemicals and remain unchanged are the keys to the new chemical possibilities. These are called catalysts of an organo-metallic sort, principally combinations of aluminum, carbon and hydrogen containing compounds, and titanium and chlorine.

The center for the development of these catalysts for the new petrochemicals is the Max Planck Institute for Coal Research at Mulheim-Ruhr of which Dr. Karl Ziegler is director.

Dr. G. Natta of Milan has used such catalysts in the production of new polymers including polypropylene and polybutylene, resulting in promising new industrial products now being experimented with in Europe and America.

Newest development in the rush of petroleum chemical advances is the making of a circle of molecules, instead of a chain, from butadiene, a familiar starting chemical obtained in cracking of oil fractions. Cyclo-dodecatriene is formed instead of a high polymer by a small change in the proportions of the titanium tetrachloride and aluminum triethyl. This simple and easy reaction was discovered at the Mulheim institute by Dr. G. Wilke. The new material is considered to be of great promise.

The cyclic process produces dibasic acids with 12 carbon atoms and lactams with 13

carbon atoms, the possible starting points of quite new plastics whose industrial uses may be as broad as the present plastics.

The chemical reactions that the new catalysts make possible are in variety called "almost unbelievable." Ethylene is polymerized into substances of 200,000 to several million molecular weight with atmospheric pressure whereas less dense materials have heretofore required high pressure. This new polyethylene is in quantity production in Germany, Japan and the United States.

Synthetic rubber production will feel the effect of the new organo-metallic catalysts, since copolymers of ethylene and propylene are being developed in the United States by both the Goodrich Gulf Co. as Ameripol SN and by the Firestone Company as Coral rubber. The new rubbers will be used in tires as well as for other purposes.

Extraordinary mileages for such tires, running up to 120,000 miles, are rumored as likely.

A new method of making tetraethyl lead, the chemical added to gasoline to prevent auto engine knock, has also been made possible by use of the catalysts. An American invention in 1920, tetraethyl lead production now is 300,000 tons a year in the United States alone. The new process using Ziegler catalysts reduces the need of so much sodium and chlorine as in the old process. It uses boiling water temperature instead of heat six to seven times as much, and it uses about half as much electrical energy. If the new tetraethyl lead process proves practical, costs should be reduced.

Dr. Ziegler summarized some of the current research and developments in one of the principal papers of the Fifth World Petroleum Congress held at New York recently.

Science News Letter, June 27, 1959

## ELECTRONICS

# "Brain" Translates Russian

AN ELECTRONIC computer at Harvard University is learning to translate Russian into English.

It is having as much difficulty as a language student. V. E. Giuliano and A. G. Oettinger indicated at the International Conference on Information Processing meeting in Paris, France.

Using a limited dictionary, the machine has learned to produce word-by-word translations simply by substituting English words directly for Russian words.

The final step in polishing a manuscript, however, is left to a human "post-editor." He often must choose the exact English word from a group of possibilities, and he must put in the prepositions, articles, prefixes and suffixes.

The information specialists, both of Harvard's Computation Laboratory at Cambridge, Mass., said several Russian technical translations have been run. Graduate stu-

dents, having special interests in the translations, served as post-editors.

Although the polished translations have not been fully evaluated, preliminary observations indicate that the machine translation is "more useful to some post-editors than to others, depending largely on their backgrounds and abilities," the investigators said.

The experimental translations also indicate that: 1. Mechanical translation can be "very useful" to a person who wants to read Russian technical articles in his own field, 2. Capable, technically qualified persons can produce passable translations in their own fields though totally ignorant of Russian, 3. The machine's technical vocabulary will be "marginally useful" to persons who know literary Russian well, and, 4. The post-editor must be alert to technical mistakes the machine occasionally makes.

In turning Russian into English, the Rus-

sian text is first recorded on magnetic tape via a Unityper. This tape, plus reels of tape containing a Russian-English dictionary, and a reel containing the machine's instructions, are fed into a Univac I computer.

The machine takes apart the text to arrange words for quick look-up on the dictionary tape. It breaks up the words into their stems and affixes. Univac then runs through the dictionary alphabetically and gets all the English equivalents. These then are arranged in the sequence of the original Russian text. The results resemble a gibberish of English, transliterated Russian, and numbered code. A subsequent machine-editing produces a text ready for the human post-editor to polish.

Science News Letter, June 27, 1959

## PUBLIC HEALTH

# Many Americans Have Physical Impairments

AMERICANS suffer from "impairments" deafness, blindness, speech defect, cerebral palsy, and loss or absence of hands and feet—at a rate of some 141 per 1,000. This is a total of 24,000,000 impairments.

Almost six Americans in 1,000 cannot read a story in an ordinary newspaper, even with the help of glasses.

Another 2,000,000 Americans, more than 12 per 1,000, have visual impairments less severe than blindness. About one person in 2,000 is totally deaf, while other hearing impairments affect many more, some 33.9 Americans in 1,000.

This latest report, in a series on the nation's health published by the Public Health Service, points to the increasing number of older persons with impairments of some kind. In those persons 75 years old or older these defects were about 12 times greater than the number found in persons under 25 years of age.

Servicemen and persons in mental and other long-term institutions were not included in the survey which covered the period July 1957 through June 1958.

Science News Letter, June 27, 1959

## ASTRONOMY

# Find Meteorite in China That Fell About 1915

A LARGE chunk of hard iron rock found in China about 1915 has now been definitely identified as a meteorite.

Two Chinese scientists analyzed the chemical make-up of this 832-pound boulder. They found it contained 88% iron and 10% silicon, the other two percent being such elements as manganese, tin and aluminum.

The meteorite has an iron black and steel gray surface, and a specific gravity more than six and a half times that of water. Its specific gravity is "quite different from all other iron ores of the earth's crust," Hu Chi-chin and Hwang Tak-min report in *Science Abstracts of China*, published by the Chinese Academy of Sciences in Peking.

Science News Letter, June 27, 1959

## BIOLOGY

# Wanted: Poisonous Fish

A unique "fishing expedition" has begun a hunt for venomous and poisonous fish. A whole new arsenal of drugs may be squeezed out of deadly fish chemicals.

By RALPH SEGMAN

A YOUNG AUSTRIAN zoologist was skin-diving about 200 yards off the Port of St. Angelo, near Naples. At a depth of 18 feet, he observed a weever fish reclining on the sea bed with a cover of mud half drawn over itself.

The diver carefully poked the fish, which for a moment appeared undisturbed. Suddenly, it wriggled away snake-like through the sand and quickly turned, facing the diver, its venomous needle-point fins vibrating aggressively. Before the man was able to get away, the weever darted at him, striking his face mask, then his jaw.

The pain soon started and grew in intensity, and the diver was barely able to reach the shore. By the time a physician arrived, the victim was begging to be killed. Morphine was no help. The upper part of the man's body was swollen and each breath and swallow produced a stab of pain. Ten days after the attack the man left the hospital fully recovered, fortunate indeed that the fish had not delivered a lethal dose of venom.

## Drugs From Fish

The weever and 300 or more other venomous and poisonous fish in the world's waters can hardly be listed among man's better friends. Some day they may be. They

soon may be meticulously bred and raised to produce useful medicines.

These fish represent a sizable potential source of new drugs that, until now, almost nobody has done anything about. And even now, while many researchers are busily screening thousands of chemicals and antibiotic broths, a few scientists have just begun to investigate the medical possibilities in marine animals.

Foremost in the new field is Dr. Bruce W. Halstead, director of the World Life Research Institute near Colton, Calif. The 39-year-old physician-zoologist organized the Institute less than a year ago for the single purpose of screening and investigating poisons and venoms, especially of marine animals.

"It is a rather small organization despite its imposing name," said Dr. Halstead, the Institute's only scientist at present. He hopes its meager resources will some day be enhanced enough, through outside help, to provide for another four or five scientists.

Why is Dr. Halstead willing to embark alone and unsupported on his ambitious "fishing expedition?" Primarily, it is because he is confident that the investigations will bring meaningful results.

Curare, the lethal concoction in which some South American Indians dipped their arrows when they wished to paralyze their foes or game, is a classic example of a useful poison. Introduced to the medical pro-

fession in the 1930's, it is injected in minute amounts as a muscle relaxant in surgery and in treating polio and lockjaw victims.

Belladonna, a plant that poisoned the Roman armies under Mark Antony, contains chemicals for relaxing stomach spasms and dilating pupils. A hemorrhage-controlling drug is extracted from ergot, a villainous fungus responsible for several medieval epidemics, one of which killed 40,000 Europeans.

Some reports already exist on marine venoms, which are injected through stings, and poisons, which are present in the flesh. A University of Pennsylvania group under Dr. L. V. Heilbrunn has a sea cucumber poison under evaluation for cancer therapy. The substance has antimutagenic properties; that is, it blocks some of the processes in cell division.

Puffer poison, lethal in six out of ten people who eat the fish, contains chemicals exhibiting a number of beneficial effects in humans when used in strictly controlled amounts. This poison can slow down the heart beat, inhibit blood clotting, and interfere with cell division. The Japanese have treated some diseases with puffer poison. They have used it to relieve pain and muscle spasms and to ease the last agonizing days for cancer victims. However, it is not regarded as a proven drug by Dr. Halstead, who wants it to be properly and scientifically evaluated.

## Fish and Physiology

Other scientists have reported that toadfish venom may be of value in diabetes; that sting ray venom inhibits the heart beat; and that stonefish and weever fish venoms, which destroy some blood components, may be useful in the laboratory.

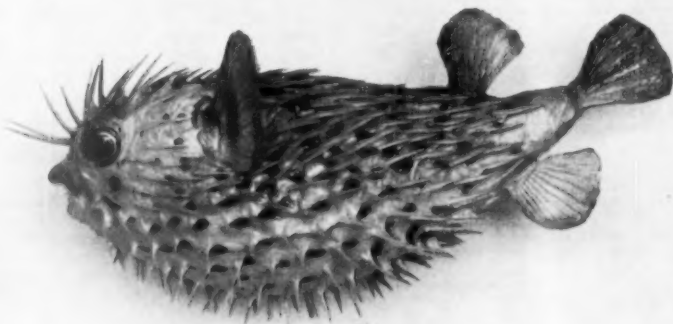
There is not much more information available than that cited in the foregoing examples. Generally, about all that is known about marine poisons and venoms is the names of the fish they come from and the clinical symptoms they produce in humans. Their chemistry and pharmacology are almost completely unknown.

Dr. Halstead has a recently published book, "Dangerous Marine Animals," describing more than 140 venomous and poisonous fish. No antidote has been developed for human victims. Only in the case of sea snake venom is there a treatment resembling an antidote; it was developed for the krait, a land snake. Because of this lack of knowledge, Dr. Halstead states:

"In viewing the field of marine biotoxicology one is awed by the enormity of the potential, the existing scientific ignorance, and relative neglect that has been displayed toward the subject. In his never-ending quest for life-sustaining substances man must continue to look toward the sea."

And, in some preliminary looking, man has indeed seen fascinating things.

(Continued on p. 410)



**DEADLY PORCUPINE FISH**—This round prickly ocean clown, which habitually inflates itself to a ridiculous size, is far from laughable. Containing the second most violent poison known, it is one of 90 or so species of the deadly puffer-like fish.



# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N.W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**THE CHALLENGE OF SCIENCE EDUCATION**—Joseph S. Roucek, Ed.—*Philosophical Lib.*, 491 p., \$10. A systematic effort to synthesize the cross-currents of thinking and the evaluation of educational practices by specialists in the field of science education on all three levels. Notes and bibliographies included.

**THE CHEMISTRY AND TECHNOLOGY OF CEREALS AS FOOD AND FEED**—Samuel A. Matz, Ed.—*Avi*, 740 p., illus., \$15. Comprehensive treatise on the production, composition and quality characteristics of cereal grains, their manufacture, and the chemical and nutritive properties of the various cereal products.

**CONCISE DICTIONARY OF SCIENCE: Physics, Mathematics, Nucleonics, Astronomy and Chemistry**—Frank Gaynor—*Philosophical Lib.*, 546 p., \$10. Terminology includes the new subdivisions of the older branches of science, such as enzymology, radiochemistry, high-energy physics, virology and others. For scientists and laymen.

**ELEMENTARY ASTRONOMY**—Otto Struve, Beverly Lynds and Helen Pillans—*Oxford Univ. Press*, 396 p., illus., \$7. Textbook treating astronomy as an integral part of physics, stressing the principal ideas and laws of physical science as they apply to the entire universe. Prior knowledge of mathematics or physics not required.

**ELEMENTS OF CALCULUS AND ANALYTIC GEOMETRY**—George B. Thomas, Jr.—*Addison-Wesley*, 580 p., illus., \$7.50. Textbook based on the author's Calculus and Analytic Geometry, revised and reorganized, designed for a one-year course.

**THE EMERGENCE OF THE GERMAN DYE INDUSTRY**—John Joseph Beer—*Univ. of Ill. Press*, 168 p., \$4.50, paper; \$4.50. Retells the story of the growth of the organic dye industry, how and why it took root in Germany and transformed that nation's scientific research, chemical

technology, education, business, international trade and laws.

**THE FAILURE OF ATOMIC STRATEGY & A New Proposal for the Defence of the West**—F. O. Miksche—*Praeger*, 224 p., \$4.50. A British Colonel's views on military strategy for the Western world.

**FALL OUT: Radiation Hazards from Nuclear Explosions**—A. Pirie, Ed., foreword by Bertrand Russell—*MacGibbon (de Graff)*, rev. ed., 176 p., \$3. Includes report on the Windscale Disaster and an analysis of the U. S. Congress report on radioactive fallout and its effects on man.

**FEATHERS AND FLIGHT**—Clarence J. Hylander—*Macmillan*, 214 p., illus., by author, \$3.95. The story of birds in action, combined with an elementary identification guide. For the young naturalist.

**FIND A CAREER IN ELECTRONICS**—Wallace West—*Putnam*, 160 p., illus., \$2.75. Explores vocational opportunities in electronics, giving the would-be electronicist advice on how to prepare himself for that career.

**FOOD VALUES IN SHARES AND WEIGHTS in Common Servings with Suggestions for Personal Food Needs**—Clara Mae Taylor—*Macmillan*, 2nd ed., 116 p., \$4. Book of tables giving nutritive values of foods.

**GENERAL CHEMISTRY: A Systematic Approach**—Harry H. Sisler, Calvin A. VanderWerf and Arthur W. Davidson—*Macmillan*, 2nd ed., 851 p., illus., \$7.95. Text for chemistry and engineering students, offering a balanced foundation in general chemistry on a logical, inductive basis.

**GREEK AND LATIN IN SCIENTIFIC TERMINOLOGY**—Oscar E. Nybakken—*Iowa State College Press*, 321 p., \$5.95. Shows the vital role of the classical languages in structuring the technical terms used in the medical and biological sciences.

**HOW TO NAVIGATE TODAY**—M. R. Hart, rev. by W. A. McEwen—*Cornell Maritime*, 3rd ed., 111 p., illus., paper, \$2.25. Describes simplified method of navigation used by U. S. Navy, after short explanation of the theory of stellar navigation.

**THE ILLUSTRATED ENCYCLOPEDIA OF MODERN SCIENCE**—The Editors of The United Educator Encyclopedia—*Stuttman*, 1528 p., illus., \$29.95.

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**IMPLANTATION OF OVA. Memoir of the Society for Endocrinology**, No. 6—P. Eckstein, Ed.—*Cambridge Univ. Press*, 97 p., illus., \$6. Proceedings of a conference held at the Ciba Foundation, London, November 1957.

**THE INCAS** of Pedro de Cieza de Leon—Victor Wolfgang von Hagen, Ed., transl. by Harriet de Onis—*Univ. of Okla. Press*, 397 p., illus., \$5.95. Sixteenth century chronicle of the Royal Road of the Incas, describing their customs and history, their folkways and destruction, with introduction by the editor.

**AN INTRODUCTION TO ELECTRONICS FOR PHYSIOLOGICAL WORKERS**—I. C. Whitfield—*St. Martins*, 2nd ed., 263 p., illus., \$3.75. Basic electronic theory with emphasis placed according to the relevance of each matter to the biologist's viewpoint. For workers in botanical, zoological, medical, agricultural and other laboratories.

**INTRODUCTION TO THE NATURAL HISTORY OF THE SAN FRANCISCO BAY REGION**—Arthur C. Smith—*Univ. of Calif. Press*, 72 p., illus., by Gene M. Christman, color photographs, paper, \$1.50. Pocket-size guide for field trips.

**KNOWLEDGE IS NOT ENOUGH**—Samuel B. Gould—*Antioch Press*, 232 p., \$3.50. Fifteen speeches by the president of Antioch College, edited to present a unified philosophy of education, and suggesting ways and means by which current educational problems can be solved.

**NATIONAL REGISTER OF SCHOLARSHIPS AND FELLOWSHIPS, Vol. I: Scholarships and Loans**—Juvenal L. Angel—*World Trade*, 3rd ed., 435 p., \$13. Lists national scholarships from private organizations and from federal agencies, and geographical scholarships by states.

**THE NORTH ALASKAN ESKIMO: A Study in Ecology and Society**—Robert F. Spencer—*Smithsonian Inst. (Govt. Print. Off.)*, 490 p., illus., paper, \$2.50. Ethnographic study of the aboriginal North Alaskan Eskimo culture, based on data collected primarily at Barrow.

**NOTES OF A SOVIET DOCTOR**—G. S. Pondev, transl. from Russian by Basil Haigh, introd. by Iago Galdston—*Consultants Bureau*, 238 p., \$4.95. A guide to the ethical conduct of the Soviet physician and to medicine in the USSR. Written for Soviet medical students, it gives the Western reader insight into Soviet thinking.

**PARTICLE DIFFERENTIAL EQUATIONS OF MATHEMATICAL PHYSICS**—H. Bateman—*Cambridge Univ. Press*, new ed., 522 p., paper, \$4.95. Presents solution of the boundary-value problems of mathematical physics by means of definite analytical expressions. First published in 1932.

**PSYCHOLOGY**—Beeman N. Phillips and M. Vere DeVault—*Steck*, 48 p., illus., by Lee Hart, \$1.75. Concepts of psychology stated in elementary form, for young boys and girls.

**RADIATIONS FROM RADIOACTIVE ATOMS IN FREQUENT USE**—L. Slack and K. Way—*U. S. Atomic Energy Commission (Govt. Print. Off.)*, 75 p., paper, 55¢. For workers in the biological and medical sciences who are concerned with estimations and calculations of dose.

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ROBERT BOYLE AND SEVENTEENTH-CENTURY CHEMISTRY—Marie Boas—*Cambridge Univ. Press*, 240 p., \$5.50. A study of Robert Boyle's influence on the development of chemistry.

RUSSIAN FOR THE SCIENTIST—John Turkevich and Ludmilla B. Turkevich—*Van Nostrand*, 255 p., illus., \$5.95. Designed for the English-speaking scientist, organized to develop a quick knack for recognition as well as an efficient way of acquiring the necessary Russian to read scientific literature.

SOVIET ASTRONOMY—AJ, Vol. 2, No. 1: A Translation of the Astronomical Journal of the Academy of Sciences of the USSR (Russian Original Vol. 35, No. 1)—Harold F. Weaver, Ed.—*Am. Institute of Physics*, 150 p., illus., paper, \$5; per year (6 issues) starting with Vol. 2, No. 1: \$25, libraries of non-profit degree granting institutions: \$10.

TERMS USED IN ARCHAEOLOGY: A Short Dictionary—Christopher Trent—*Philosophical Lib.*, 62 p., \$2.75. Definitions and explanations of 240 archaeological terms, ranging from Abbeville to Yucatan, with accent on Britain. For the layman.

ULTRACENTRIFUGATION IN BIOCHEMISTRY—Howard K. Schachman—*Academic*, 272 p., illus., \$8.80. Theory and general description of the ultracentrifuge as a tool for the preparation and separation of proteins, viruses and other sedimentation experiments.

VACATIONS ABROAD, Vol. XI, 1959—*Unesco* (N. Y.), 11th ed., 180 p., paper, \$1.25. Directory of vacation activities, courses and seminars organized in more than 75 countries by about 740 institutions, designed to enable interested persons to become better acquainted with the cultures of other countries.

Science News Letter, June 27, 1959

## Questions

BIOLOGY—What benefits can be gained from limited doses of the lethal poison of the puffer fish? p. 407.

GENETICS—How can human chromosomes be mapped? p. 403.

PUBLIC HEALTH—Why is a live polio virus vaccine preferable to the Salk killed vaccine? p. 405.

Photographs: Cover, General Electric Company; p. 403, Eli. Lilly and Company; p. 405, Standard Oil Company; p. 407, Field Museum; p. 412, Eastman Chemical Products, Inc.

## Do You Know

The most common fish in the sea is a species of Cyclothone, a deepwater fish sometimes called *bristlemouth*, rarely seen by the average person.

While the population of the United States increased less than 20% between 1947 and 1957, hospital admissions rose about 40%.

One of the greatest rarities in the bird world is the mossy-throated bellbird, named for the black and moss-like strings of flesh that hang in a large patch on its throat.

The U. S. Coast Guard has approved an all plastic *lifeboat* after a series of gruelling tests and the boat may now be used on all American-flag cargo and passenger vessels.

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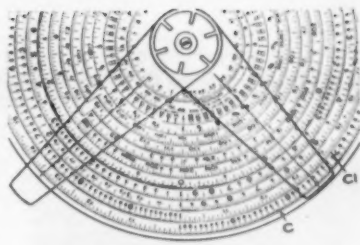
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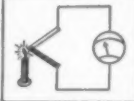
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SMALL PRECISION GEARS MADE FOR INDUSTRY, Science & development. William A. Phelps, Manufacturing Horologist, 4106 1/2 Glenway Avenue, Cincinnati 5, Ohio.

## Wanted: Poisonous Fish

(Continued from p. 407)

Some species of sea snake possess venom reputed to be 50 times more potent than that of the king cobra. Fortunately, most sea snakes, which inhabit coastal waters of the Pacific and Indian Oceans, have a poorly developed venom apparatus and are docile in nature.

Puffer-like fish have an amusing characteristic of inflating themselves to ridiculous size and making a grinding racket with their teeth as they gulp air or water. Not so amusing is puffer poison. It is thought to be the second most violent biotoxin known, exceeded only by the toxin of the bacterium that causes botulism.

As deadly as it is, the puffer commands the highest prices in Japan as a food fish. The fugu, as it is called, is prepared in special restaurants by licensed puffer chefs trained to discard the poisonous organs. The only way of inactivating the poison when the organs are not removed is by cooking the meat in a strong solution of sodium bicarbonate, a treatment that can ruin the fish for consumption in a restaurant.

Most jellyfish produce stings varying in intensity from hardly noticeable to quite irritating. However, one species known as the sea wasp is the most venomous sea animal known. Sea wasp venom can destroy a man in three to eight minutes.

## Variable Poisons

One of the great mysteries concerning poison fish is that a particular species may be perfectly edible in one area and deadly in another. Or a type of fish a person has eaten hundreds of times may suddenly turn violently poisonous, as happened recently in a small Japanese town on Minamata Bay. Many of the townfolk subsisted on fish they caught in the bay.

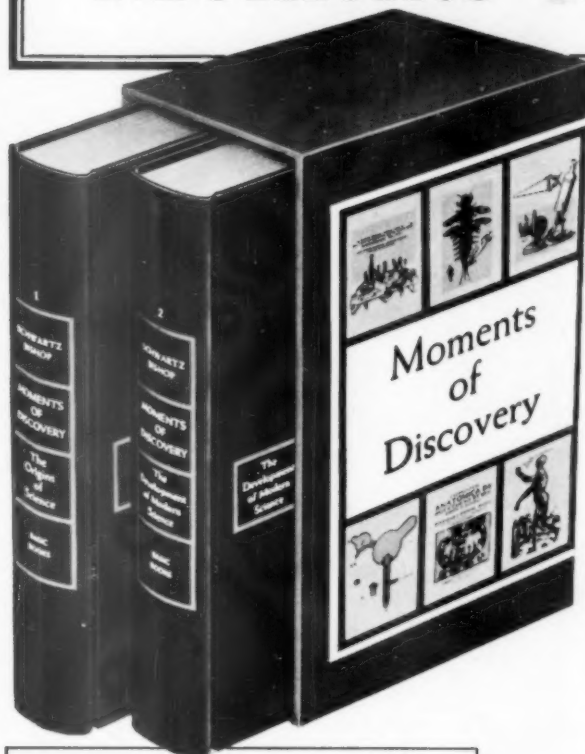
In 1953, a strange nerve illness began affecting the people, and by 1956 it had become an epidemic. One-third of the people stricken died. Dogs, cats, pigs and crows eating the fish also died. No one is certain how the fish became poisonous. There is some conjecture that the blame may be leveled at a nearby fertilizer plant that discharged wastes into the bay. Or it might have come about through a slight change in the eating habits of one species of bay inhabitant. Becoming poison bearers, perhaps because of a chemical change in their bodies, they might have been eaten by other fish, which were eaten by still others, until most of the bay life turned poisonous.

The entire subject of poisonous and venomous marine life is one to be investigated now and in the future by medical researchers. And the subject must be considered more than just a public health problem. As Dr. Halstead points out:

"There is an ever-increasing amount of scientific evidence that these noxious organisms and their poisons may serve as sources of the life-giving antibiotics, anti-cancer, and other indispensable therapeutic agents of tomorrow."

Science News Letter, June 27, 1959

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**DECORATIVE PLASTIC PANELS** reinforced with glass fiber may be used for luminous ceilings, room dividers and cabinet doors. The translucent material is available in 30-inch-wide flat panels in standard 50-foot rolls and can be cut, nailed or drilled.

Science News Letter, June 27, 1959

**HOME PLUMBING KIT** has 101 plumbing parts and an eight-page illustrated instruction book that should allow the homeowner to make his own minor plumbing repairs. The kit includes articles ranging from a plunger to a bottle of porcelain glaze to a bathtub stopper.

Science News Letter, June 27, 1959

**TRICYCLE SEAT** of polyethylene resists the wearing action of exposure to sunlight, rain and rough handling. The plastic is crimped tightly into the metal frame's sides. Air space between the plastic and the metal insulates the rider against the shock of riding over bumps.

Science News Letter, June 27, 1959

**PLANT SPRAYER**, shown in the photograph, for fighting insects and disease on garden plants and shrubs is made of lightweight, durable plastic. It is used with a light pumping action similar to that of a



trombone sprayer and is filled through a wide opening at the top. The sprayer releases a fine spray that gives wide coverage.

Science News Letter, June 27, 1959

**ELECTRICAL INSULATING TAPE** with vinyl base protects against four causes of insulation failure: moisture, surface contamination, corona and excessive heat. It

may also be used for safety purposes on tool handles and sharp edges, and to strengthen hockey sticks or repair baseball bats.

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**CELESTIAL GLOBE**, 14 inches in diameter, consists of a colored terrestrial or earth globe within a transparent celestial globe. It offers an easily used and understood model of the universe, providing aid in visualizing and identifying the stars and constellations and their relationships to each other, and to the earth.

Science News Letter, June 27, 1959

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**SLING LAUNCHER TOY** consists of a stick with a strong rubber band and a feather-shaped projectile that can be shot 300 feet into the air. The projectile glides and spins on its way back to the ground much like a leaf or tree seed would.

Science News Letter, June 27, 1959



## Nature Ramblings



### By HORACE LOFTIN

**STEALTH** or camouflage is quite often enough to protect small animals from predators in jungles, woodland or a grassy plain. But on the open desert where spaces are wide and cover almost absent, the premium is on speed and elusiveness.

Showing a parallel evolution to meet similar conditions in different parts of the world, the jerboa of the Old World and our own native kangaroo rat both have attained oversized hind limbs. Like diminutive kangaroos, these tiny rodents can spring surprising distances at a good rate of speed. But perhaps as important, their springs and jumps when being pursued are highly erratic, serving to confuse thoroughly the carnivore which chases them.

Another important adaptation of these rodents, shared by many other tiny dwellers of the desert, is the ability to do with little or no water at all. Water for their body processes is obtained, in large part,

### Living in the Desert



by a chemical break-down of the foods they eat, releasing enough of the life-giving liquid for their needs.

Desert mammals may also supplement their water supply by eating moisture-laden plants, such as the prickly pear cactus. But in addition to getting water, these animals must conserve water. Toward this end, there is little wastage of water in their excretions, and they tend to live through the hot daylight hours in cool burrows or

crevices, which reduces their body loss of water due to perspiration.

Even in captivity where they are given an abundance of water, many of the desert mammals refuse to touch it, relying on their food for liquids.

But in the desert, even water-bearing plant life may be hard to come by during the driest months. Thus the little desert rodents must "make hay after the rain falls," collecting and storing the seeds from the desert blossoms as quickly as possible before they are blown away by the winds. For this job, many are equipped with cheek pouches which they stuff full of seeds and other foods to carry back to their burrows.

A final solution to the problem of maintaining life through the desert summer is that of "summer hibernation" or estivation. Many of the small mammals thus pass the hottest and driest months of the year in a deep sleep from which they do not awaken till the climate becomes more tolerable.

Science News Letter, June 27, 1959



